| 4 | (a) |  |  | 1 | B1 | cao |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | 2 | 1 | B1 | cao |
|  | (c) |  |  | 1 | B1 | cao |
|  | (d) |  |  | 1 | B1 | cao |
|  | (e) |  | 78 | 1 | B1 | cao |
|  |  |  |  |  |  | **Total 5 marks** |

| 5 | (a) |  | Correct shape | 1 | B1 | cao  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | 17, 21 | 1 | B1 | cao |
|  | (c) |  | 33 | 1 | B1 | cao |
|  | (d) |  | The numbers of shaded squares are odd numbers | 1 | B1 | Accept e.g. 50 is an even number **or** the sequence is all odd numbers **or** 49 is in the sequence so 50 can't be as it's only one more **or** 53 is the next number after 49 **or** 49 and 53 are in the sequence (so not 50)**or** nth term is 4*n* + 1 and for 50 *n* = 12.25 / not an integer |
|  |  |  |  |  |  | **Total 4 marks** |

| 6 |  | 6 × 100 (= 600) **or** 17.5 ÷ 100 (= 0.175) |  | 3 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | “600” ÷ 17.5 (= 34.28…) **or** 6 ÷ “0.175” (= 34.28…) |  |  | M1 | ft incorrect conversion |
|  |  |  | 34 |  | A1 | cao |
|  |  |  |  |  |  | **Total 3 marks** |

| 7 | (a) |  | 13*x* – 2*y* | 2 | B2(B1 | accept – 2*y* + 13*x*for 13*x* or – 2*y*) |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 2*n* = 16 – 5 or 2*n* = 11 oe **or (**16 – 5) ÷ 2 |  | 2 | M1 | for a correct first step **or** a correct calculation for *n* |
|  |  |  | 5.5 |  | A1 | for 5.5 or  or  |
|  |  |  |  |  |  | **Total 4 marks** |

| 8 | (a) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **ramen** | **soba** | **udon** | **Total** |
| **Boiled** | 18 | **5** | **8** | 31 |
| **Fried** | **10** | 12 | 7 | **29** |
| **Total** | **28** | **17** | 15 | 60 |

 | Correct table | 3 | B3(B2B1 | All 6 correct entries4 or 5 correct entries2 or 3 correct entries) |
|  | (b) |  |  | 1 | B1 | accept 0.11666... (accept 2 d.p. or better truncated or rounded) or 11.666...% (accept 2 s.f. or better truncated or rounded) |
|  |  |  |  |  |  | **Total 4 marks** |

| 9 |  | 360 – (59 + 115 + 68) (= 118) |  | 4 | M1 | angle values may be seen on diagram throughout |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | *x* = 62 |  | A1 | from correct working |
|  |  | Angles in a quadrilateral add up to 360. Accept “4-sided shape”Angles on a straight line add to 180° Base angles in an isosceles triangle (are equal) |  |  | B2(B1 | (dep on M1) for all correct reasons for their method(dep on M1) for 1 correct reason for their method) |
|  |  |  |  |  |  | **Total 4 marks** |

| 12 | (a) |  | 4*x* – *x*2 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | e.g. 1.5 × 2.4 – (−5.6) **or** 1.5 × 2.4 + 5.6 **or** 3.6 + 5.6 oe |  | 2 | M1 | for a correct substitution  |
|  |  |  | 9.2 |  | A1 | accept or  |
|  | (c) | *y* + *e* = *dx* oe **or**  |  | 2 | M1 | for a correct first step |
|  |  |  |  |  | A1 | oe e.g.  |
|  |  |  |  |  |  | **Total 5 marks** |

| 13 | (a) | e.g.  oe **or** 0.24 × 100 |  | 2 | M1 | for a complete method |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  | 24 |  | A1 |  |
|  | (b) | e.g. 32.50 × 180 (= 5850) **or** e.g. 0.94 × 32.50 oe (= 30.55)  |  | 3 | M1 | for finding the total income **or** 94% of the cost of one ticket |
|  |  | e.g. 0.94 × “5850” oe**or** “5850” – 0.06 × “5850” oe**or**180 × “30.55”  |  |  | M1 | for a complete method  |
|  |  |  | 5499 |  | A1 |  |
|  |  |  |  |  |  | **Total 5 marks** |

| 14 | (a) |  | Reflection *x* = 1 | 2 | B1 | for reflection with no mention of translate, rotate, enlarge, move |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | B1 | for *x* = 1 with no mention of a vector, angle or scale factor |
|  | (b) |  | Rotation about (0,0) 90° clockwise | 3 | B1 | for rotation with no mention of translate, reflect, enlarge, move |
|  |  |  |  |  | B1 | for 90° clockwise/270° anticlockwise/−90° with no mention of a vector, line of symmetry or scale factor |
|  |  |  |  |  | B1 | for (centre =) (0,0), accept origin or *O* with no mention of a vector, line of symmetry or scale factorDo not accept  for centre |
|  |  |  |  |  |  | **Total 5 marks** |

| 16 |  | e.g.  **or**  **or**  |  | 2 | M1 | for finding a common denominator with at least one fraction correct |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |    | Shown |  | A1 | dep on M1, for a complete correct method leading to  |
|  |  |  |  |  |  | **Total 2 marks** |

| 18 | (a) |  | 70 < *s* ≤ 80 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | 10 × 45 + 16 × 55 + 19 × 65 + 23 × 75 + 12 × 85**or** 450 + 880 + 1235 + 1725 + 1020 (= 5310) |  | 4 | M2 | *f* × *d* for at least 4 products with correct mid-interval values and intention to add.If not M2 then award M1 for *d* used consistently for at least 4 products within interval (including end points) and intention to add **or** for at least 4 correct products with correct mid-interval values with no intention to add |
|  |  | “5310” ÷ 80  |  |  | M1 | dep on at least M1 allow division by their provided addition or total under column seen |
|  |  |  | 66.4 |  | A1 | accept 66.37 – 66.4 |
|  |  |  |  |  |  | **Total 5 marks** |

| 20 | (i) |  | 21, 27 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (ii) |  | 21, 23, 24, 25, 27, 29  | 1 | B1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 21 | (a) |  | 5*y*3(3*y* + 4*u*) | 2 | B2(B1 | for 5*y*3(3*y* + 4*u*)for 5*y*(3*y*3+ 4*uy*2) **or** 5*y*2(3*y*2+ 4*uy*)**or** *y*2(15*y*2+ 20*uy*) **or** *y*3(15*y* + 20*u*) **or** 5*y*3(…) where there is only one mistake in the brackets) |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) | oe **or** oe **or** oe |  | 3 | M1 | for removal of fraction in a correct equation |
|  |  | e.g. **or** oe **or**  |  |  | M1 | for terms in *x* on one side **and** numbers on the other side in an equation, allow correct rearrangement of their equation in the form *ax* + *b* = *cx* + *d* |
|  |  |  | 2.75 |  | A1 | (dep on M1) oe e.g. or  |
|  |  |  |  |  |  | **Total 5 marks** |

| 22 | (a) |  | 2.84 × 109 | 1 | B1 |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b) |  | 0.000 25 | 1 | B1 |  |
|  |  |  |  |  |  | **Total 2 marks** |

| 23 | (a) | for 0.035 × 40 000 oe (= 1400) **or** 1.035 × 40 000 oe (= 41 400) | **OR** 40 000 × 1.0353 |  | 3 | M1 | for finding 3.5% **or** 103.5% of 40 000 | **OR** M2 for 40 000 × 1.0353**or** 40 000 × 1.0354(= 45 900.92)(M1 for 40 000 × 1.0352 (= 42 849)) |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 1.035 × “41 400” oe (= 42 849)1.035 × “42 849” oe (= 44 348.72) |  |  | M1 | for completing method to find total amount in the account |
|  |  |  | 44 349 |  | A1 | accept 44 348 – 44 349 |
|  |  |  |  |  |  | **SC:** if no other marks gained award M1 for 0.105 × 40 000 oe **or** 4200 **or** 44 200accept (1 + 0.035) as equivalent to 1.035 throughout |
|  | (b) | e.g. 30 481 ÷ (1 – 0.065) **or** 30 481 ÷ 0.935 |  | 3 | M2(M1) | for a complete method for 30 481 ÷ (100 – 6.5) (= 326) **or** (100 – 6.5)% = 30 481 **or** 93.5% = 30 481**or** e.g. (1 – 0.065)*x* = 30 481 |
|  |  |  | 32 600 |  | A1 |  |
|  |  |  |  |  |  | **Total 6 marks** |

| 24 |  | 2 × *π* × 7 (= 43.982… or 14*π*) **or** (2 × *π* × 7) ÷ 2 (= 21.991… or 7*π*) **or** 2 × *π* × 9 (= 56.548… or 18*π*) **or** (2 × *π* × 9) ÷ 2 (= 28.274… or 9*π*) |  | 3 | M1 | for finding the circumference of either the full circle or the length of the arc for either semicircle |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. “21.991” + “28.274” (= 50.26…)**or** “7*π*” + “9*π*” (=16*π*) **or** “21.991” + “28.274” + 2 (= 52.26…)**or** “7*π*” + “9*π*” + 2 (= 52.26…)**or** “21.991” + “28.274” + 2 + 2 **or** “7*π*” + “9*π*” + 2 + 2 |  |  | M1 | for a method to find the length of the two arcs with intention to add |
|  |  |  | 54.3 |  | A1 | accept 54.2 – 54.3  |
|  |  |  |  |  |  | **Total 3 marks** |

| 25 | (a) |  | 16*x*12*y*20 | 2 | B2 | B1 for an answer in the form *axnym*  with 2 correct from*a* = 16, *n* = 12, *m* = 20 |
| --- | --- | --- | --- | --- | --- | --- |
|  | (b)(i) | (*x* ± 9)(*x* ± 4) |  | 2 | M1  | for (*x* ± 9)(*x* ± 4) **or** for (*x* + *a*)(*x* + *b*) where *ab* = −36 or *a* + *b* = 5 |
|  |  |  | (*x* + 9)(*x* – 4) |  | A1 |  |
|  | (ii) |  | –9, 4 | 1 | B1 | ft from (b)(i) |
|  |  |  |  |  |  | **Total 5 marks** |

| 26 |  | e.g.  **or**  **or**  **or**  **or**  **or**  |  | 4 | M1  | for a correct trig ratio for *AB* **or** *AD*accept 180 – 90 – 65 for 25 |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | e.g. (= 17.654…) **or** (= 17.654…) **or** (= 17.654…)**and**(= 7.460…) **or** (= 7.460…)**or** (= 7.460…) |  |  | M1  | for finding *AB* **and** *AD*Allow use of Pythagoras (= 7.460…)or(= 17.654…) |
|  |  | (“17.654…” × 2) + (“7.460…” × 2) oe |  |  | M1 | for a complete method to find the perimeter |
|  |  |  | 50.2 |  | A1 | accept 49.6 – 50.6 |
|  |  |  |  |  |  | **Total 4 marks** |